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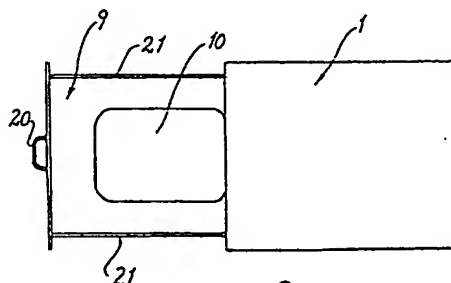
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54 A mini detonation chamber.

57 A single-use mini detonation chamber designed to absorb pressure stresses and splinters from interior detonations or deflagrations, consisting of two mutually interposed and mutually displaceable portions (1, 9), which are designed such that, in the closed retracted position, the one portion absorbs radial stresses (1) and the other axial stresses (9).



**Fig. 3**

**EP 0 315 616 A1**

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## Description

## A MINI DETONATION CHAMBER

## TECHNICAL FIELD

The present invention relates to an extremely light container with a capability to entrap splinters and damp the effect of shock waves on the immediate surroundings on detonation or deflagration within the container of explosive charges of limited size, for example of the nature of hand grenades or small-scale terrorist explosive devices.

The container, or "mini detonation chamber" according to the present invention is intended to deal with one sole detonation and is, thereafter, to be considered as used. Hence, it is primarily intended to be used in the disarming of explosive charges in such places where protection for the immediate surroundings is given high priority.

## BACKGROUND ART

In this art, there are a few previously known constructions intended to fulfil substantially the same purpose as that of the present invention, but these are - despite their relatively small outer dimensions - heavy, unwieldy and expensive and, in addition, are generally intended to be reusable. These prior-art constructions primarily consist of different types of hollow steel blocks with solid walls and a hatch or door much like that employed on a safe or strong box, which gives access to the interior of the chamber.

Another design which is closer to the apparatus according to the present invention (while failing to display the advantages of the latter) is disclosed in USPS 4 027 601. This prior-art disclosure relates to a mini detonation chamber based on two powerful mutually interposed steel cylinders with open ends, of which the one is, first, fixedly retained in a frame with its longitudinal axis horizontal and, secondly, is bevelled towards the outer corners such that the second steel cylinder, which is of greater diameter than the first, may be passed over the first with its longitudinal axis in the vertical direction. The second steel cylinder will, in this instance, seal off the open ends of the first cylinder. In addition to these robust steel cylinders, the prior-art arrangement includes buffer material which is disposed interiorally in the inner cylinder and which may be said to consist of foamed plastic, vermiculite or the like.

The disadvantage inherent in this prior-art mini detonation chamber is, apart from its weight, that it is highly circumstantial to handle since it must first be dismantled before the explosive charge under consideration may be placed in its interior. Moreover, it can hardly be described as an enjoyable experience to remount the second cylinder in place if the behaviour and characteristics of the explosive charge were unknown. Furthermore, at least two men would probably be required for this operation, since the second cylinder must be raised quite some distance.

## SUMMARY OF THE INVENTION

On the other hand, the mini detonation chamber according to the present invention has now been designed in such a manner that only light-weight materials such as aluminium sheet and hard mineral wool have been required. Consequently, it will be extremely light as compared with prior-art apparatuses of similar type. Moreover, it is designed in a manner which could well be described as following the box drawer principle, which makes it very simple to use.

Granted, the mini detonation chamber according to the present invention consists, like the detonation chamber according to the above-mentioned U.S. patent, of two mutually movably interposable tubular or cylindrical parts, but the problem solution itself is completely different. Hence, both of the cylindrical parts according to the present invention are disposed in one another with coincidental longitudinal axes, so that the outer portion which consists of an open-ended tube of reinforced jacket surface, concentrically surrounds the inner portion which is wholly enclosed apart from an aperture along one portion of its jacket surface and is provided with powerfully reinforced ends designed with deformation zones. Thus, the inner portion is designed to absorb longitudinal stresses and further to be supported in the radial direction by the outer portion which, in its turn, is designed to absorb radial loadings but be preserved completely from longitudinal stresses.

In order to "load" the chamber, i.e. place the explosive charge under consideration therein, the inner portion is quite simply partly withdrawn from the outer in exactly the same manner as a drawer, whereafter the explosive charge is passed down through the aperture in the jacket surface of the inner portion. A suitable accommodation seat which centers the charge is disposed in the inner portion immediately beneath the aperture. The accommodation seat may, for example, consist of a mesh basket possibly reinforced with buffer material, for example in the form of a water sack. As soon as the charge is in place, the inner portion may be retracted and locked in its retracted position. The lock will never be influenced in the event of detonation, so it need not be of particularly powerful design.

In order to build in sufficient resistance and suitable deformation zones into a construction which is, moreover, extremely light in weight, we have used, according to the present invention, smooth and corrugated, preferably trapezoidal aluminium sheet and hard mineral wool mats as our point of departure.

Thus, the jacket surface of the outer portion consists, according to the present invention, of a plurality of layers of smooth and corrugated aluminium sheet, in which the corrugation creases extend in the longitudinal direction of the portion, together with hard mineral wool mats, while the inner portion is constructed of smooth aluminium sheet with its

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ends reinforced by a plurality of layers of crosswise laid strata of corrugated sheet and hard mineral wool mats.

#### BRIEF DESCRIPTION OF THE ACCOMPANYING DRAWINGS

The apparatus according to the present invention is defined more closely in the appended Claims, and will now be described in greater detail by means of one embodiment as shown on the accompanying Drawings.

In the accompanying Drawings:

Fig. 1 is a longitudinal section through the detonation chamber according to the present invention;

Fig. 2 is a partially sectioned end elevation thereof; and

Fig. 3 is a top-plan view, on a smaller scale, of the apparatus according to the present invention in the opened state.

#### DESCRIPTION OF PREFERRED EMBODIMENT

Referring to the Drawings, the apparatus shown thereon consists of a first outer portion 1 in the form of an open-ended cylinder or tube consisting of an outer aluminium sheet 2, a hard mineral wool mat 3, a trapezoidal profile aluminium sheet 4 and an inner smooth aluminium sheet 5. There are, furthermore, provided annular sealing ends 6 and 7 to prevent moisture and the like from entering in between the layers. Of these latter, the end plate 7 is slightly larger than the thickness of the jacket wall and functions in this way as an arrest against excessively long displacement of the inner portion 9 which is displaceably disposed within the portion 1. Two vents 8 in the form of through conduits of limited diameter are also disposed in the jacket wall of the portion 1.

The second, inner portion 9 is wholly enclosed apart from an aperture 10 in its jacket wall 11. The jacket wall is manufactured of smooth aluminium sheet and displays no particular reinforcements, since it is not intended to absorb any actual radial stresses. In that direction, this portion will be supported by the outer portion 1. In the longitudinal direction, the natural mechanical strength of the sheet will be sufficient. On the other hand, the ends of the inner portion are greatly reinforced and provided with deformation zones. The ends are, thus, constructed from a smooth inner aluminium plate 12, four layers of crosswise disposed trapezoidal profile sheet 13-16, one layer of hard mineral wool 17, an outer smooth aluminium sheet 18 and, finally, a number of outer reinforcement profiles 19 disposed transversely of the end.

There is further provided a handle 20 for manoeuvring the inner portion. Between the inner and outer portions there are, furthermore, guide bars 21 and guide rails 22, as well as locking means 23 for retaining the portion 9 within the portion 1.

The locking means may be of relatively simple design, since they will not be exposed to major stresses but are simply provided to retain the inner portion in place. This should, namely, lightly run along slide rails and guide bars within the outer

portion so that a suspected explosive charge is not subjected to any unnecessary stresses. As will be apparent from Fig. 1, the vents 8 in the outer portion are in register with the aperture 10 when the inner portion is fully retracted in the outer portion. It will further be apparent from Fig. 3 that the aperture 10 is completely free when the inner portion 9 is wholly withdrawn from the outer portion 1.

Since an explosive charge must always be brought as close as possible to the centre of a detonation chamber, the inner portion 9 is also provided with a seat for the charge. In this case, this is in the form of a mesh basket 24 in which, in the illustrated embodiment, a buffer or damming in the form of a water sack 25 has been placed, thereon the charge 26, and finally a second water sack 27.

As soon as the charge 26 has been placed on the water sack 25 and the second water sack 27 has been superposed, the portion 9 may be moved into place and the locking means 23 closed. Thereafter, the charge consisting, for example, of a terrorist explosive device which could without difficulty have been detonated on site, may be removed under acceptable protection for the immediate surroundings or, if deemed more favourable, be detonated immediately within the detonation chamber.

#### Claims

1. A mini detonation chamber designed to absorb inner pressure stresses and splinters from deflagrations and detonations of explosive charges, essentially including two mutually movably disposed parts (1, 9) for opening and closing the chamber, each being designed to be able to absorb inner pressure stresses in specific directions and, if necessary, to be supported by the other portion in remaining directions, **characterized in that** it consists of a first outer cylindrical portion (1) with a reinforced jacket surface and open ends, and a similarly cylindrical second inner portion (9) which is axially shiftable within this outer portion (1) and is wholly closed apart from an aperture (10) along a portion of its jacket surface (11) and which is designed with powerfully reinforced ends (12-19).

2. The mini detonation chamber as claimed in Claim 1, **characterized in that** the inner portion is guided in the outer portion along slide rails (20) and guide bars (21); and that said portions are provided with fixed arrests (7) against excessively long relative displacement in one or the other direction, respectively, and actuatable locking means (23) for holding together the parts (1, 9) in the closed position when necessary.

3. The mini detonation chamber as claimed in Claim 1 or 2, **characterized in that** the reinforced walls of each respective portion are built up by stratiform disposed smooth (2, 5, 12, 18) and corrugated (4, 13-16), preferably trapezoi-

dal profiled sheets, and hard mineral wool (3, 17).

4. The mini detonation chamber as claimed in Claim 3, **characterized in that** the outer portion includes at least one layer of trapezoidal profiled sheet (4) with the profile creases disposed axially, while the ends of the inner portion include a plurality of layers of crosswise disposed trapezoidal profiled sheets (13-16).

5. The mini detonation chamber as claimed in Claim 4, **characterized in that** the ends are moreover reinforced by outer flanges (19).

6. The mini detonation chamber as claimed in any one or more of Claims 1-5, **characterized in that** the second, inner chamber (9) displays a

mesh basket (24) disposed beneath the aperture (10) in which a possible explosive charge (26) may be disposed centrally in the chamber.

7. The mini detonation chamber as claimed in Claim 6, **characterized in that** the mesh basket (24) provides room for buffer or damping material (25, 27), for example in the form of water sacks.

8. The mini detonation chamber as claimed in any one or more of Claims 1-7, **characterized in that** the outer portion displays one or more vents (8) disposed flush with the position of the aperture of the inner portion in the closed position.

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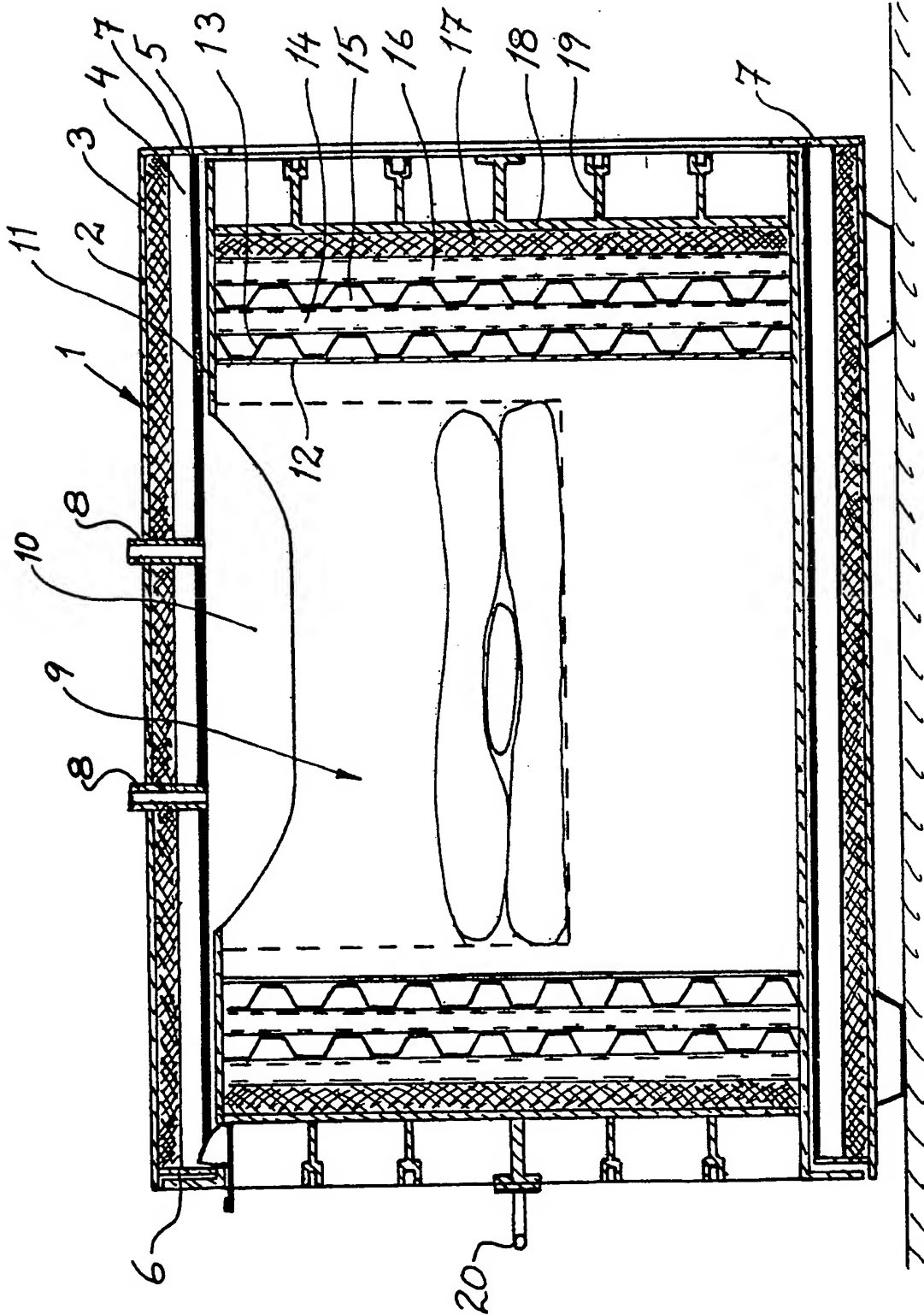
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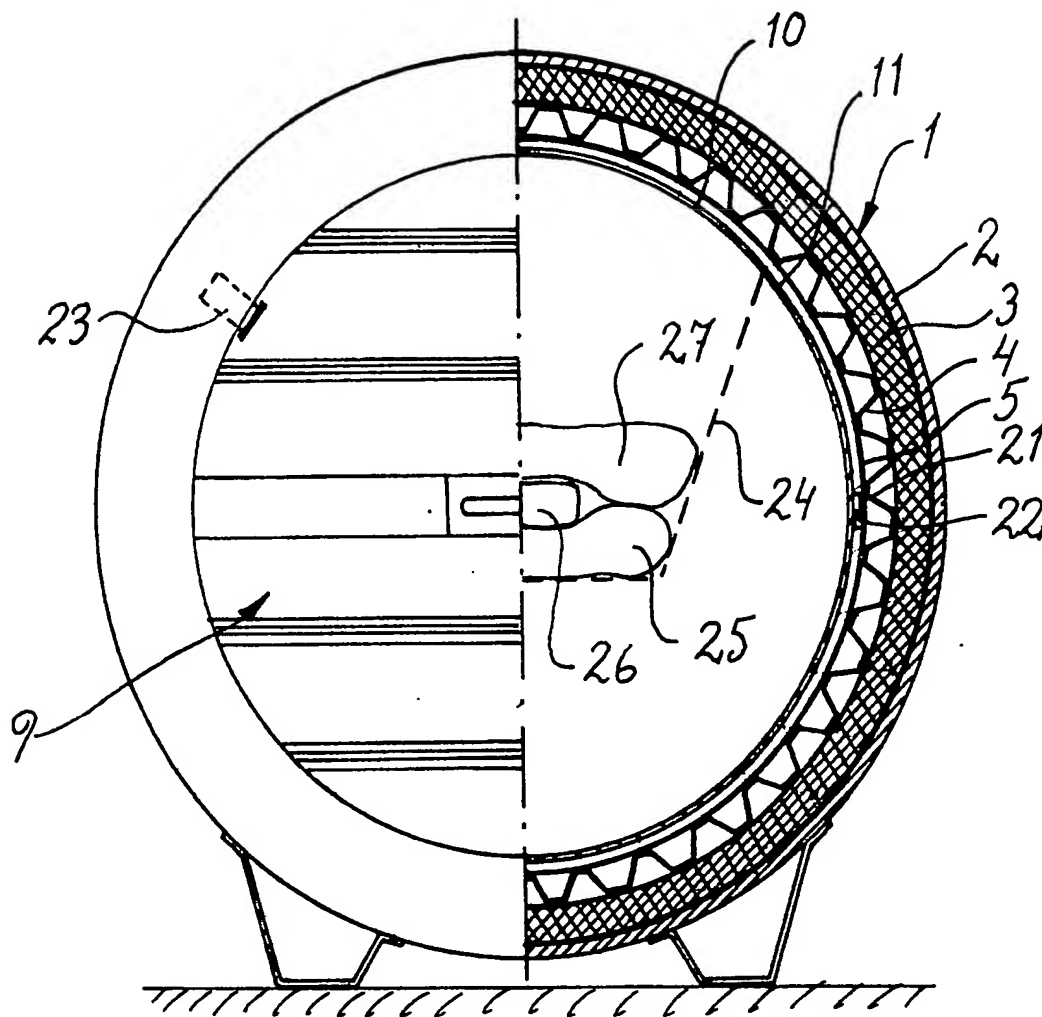
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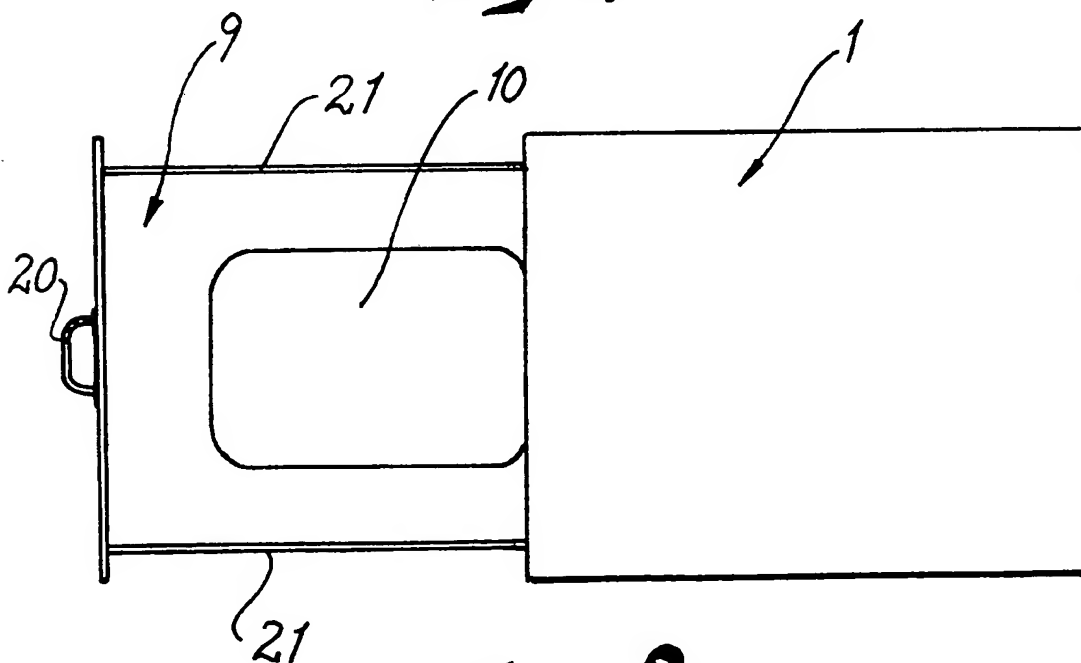
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**Fig. 1**



**Fig. 2**



**Fig. 3**



EP 88 85 0381

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 4)
Y	FR-A-2 553 810 (AB BOFORS) * Abstract; page 2, lines 15-18; page 3, lines 9-12; page 4, lines 22-36; figures 1,2 *	1	F 42 D 5/04
A	---	2	
Y,D	US-A-4 027 601 (HICKERSON) * Column 1, last paragraph; column 2, lines 1-49; figures 1,2 * -----	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			F 42 D F 42 B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 07-02-1989	Examiner RODOLAUSSE P.E.C.C.
<b>CATEGORY OF CITED DOCUMENTS</b>			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document	

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